Chongqing Zhifei Biological Products Co., Ltd.

2023

Interim Business Performance

Chongqing Zhifei Biological Products Co., Ltd.

Board of Directors

August 2023

Important Notes

The main content and data of this report are from the 2023 Interim report of Chongqing Zhifei Biological Products Co., Ltd. In case of any discrepancy between interpretations of the text, the Chinese version shall prevail.

I. Overview of Principal Business

(I) Industry situation and trends

1. Industry innovation and upgrading as market space continues to expand

The biopharmaceutical industry is a strategic emerging industry that involves national welfare and people's livelihood, economic development, and national security, and is highly propulsive, and growth-oriented. With the continuous development of China’s economy and society, structural changes such as population aging, urbanization, and the expansion of middle-income groups have stimulated greater health needs, prompting the biopharmaceutical industry to usher in broader development space and more diversified development opportunities. Technological innovation is driving the rapid development of the biopharmaceutical industry. An increasing number of globally competitive innovative products and services continue to emerge, accelerating the improvement of the public health system and deepening of the Healthy China Initiative, putting people's health first to safeguard their diversified and multi-level health needs.

The vaccine industry is a sub-segment of the biopharmaceutical field and an important part of the bioeconomy. As the most efficient and cost-effective means of preventing and controlling infectious diseases, vaccines play an important role in preventing infection, re-transmission after infection, and severe illness and death. The continuous improvement of public awareness and willingness to get vaccinated will lead to wider acceptance and use of vaccines. According to relevant reports by Frost & Sullivan, the global market size of vaccines for human use surged from about USD27.7 billion in 2017 to about USD46 billion in 2021, with a CAGR of 13.5%. As more innovative vaccines are developed and approved in the future, the amount is expected to reach USD83.1 billion in 2025 and USD131 billion in 2030. The global vaccine market is swelling at a good clip, driven by growing public health awareness, requirements for infectious disease prevention, and increased consumption capacity.

In China, people are placing greater importance on their health and wellness, as the demand for vaccination continues to grow. In the past, vaccination is mainly used for the prevention of diseases in infants and young children, and the awareness of vaccination among adults needs to be

strengthened. With the popularization and development of vaccination work, vaccination, and disease prevention have gradually become the healthy choice for groups of all ages. Frost & Sullivan predicts that the size of China's vaccine market will exceed RMB340 billion in 2030, growing at a CAGR of 15.95% during the 2020–2030 period. This equates to faster growth than the global size and a promising development trend. China's considerable population base provides sufficient space for the development of the vaccine market. Add in the improvements to the public health system and increasing emphasis on immunization, the penetration of the non-NIP vaccine market will progressively rise, which is expected to further expand the scale of China's vaccine market.

The per capita expense in China's vaccine market is still much lower than that in developed countries. Higher levels of personal consumption and R&D innovation will certainly lead to a burgeoning vaccine industry, and the enormous potentials of the vaccine market will be further tapped into in the future. As domestic vaccine companies progress in R&D, more homegrown innovative vaccines will be approved. The completion of the shift of vaccines from univalent to polyvalent and from unipathogen to multipathogen better meets the public's new needs and expectations for vaccines, promotes the continuous expansion of end markets, and helps exploit the growth potential of the industry.

2. Policy guidelines issued to promote the high-quality development of the industry

In recent years, the party and state have vigorously supported the development of the biopharmaceutical industry, introducing a number of policies and measures to encourage and promote its development and innovation, and putting forward clear strategic goals, growth trajectories, and industrial planning for its high-quality development.

Vigorously developing biomedicine is an important pillar of support for advancing the construction of a healthy China. The Central Committee of the Communist Party of China and State Council issued the Outline of the Healthy China 2030 Plan, strategically prioritizing initiatives promoting people's health and well-being, which opened a window of opportunity for the rapid development of the big health industry. General Secretary Xi Jinping highlighted at the 12th

Meeting of Central Commission for Comprehensively Deepening Reform that biosecurity is vital to people's health, national security and long-term stability of the country, and must therefore be included into the national security system.

According to the Communist Party of China's 20th National Congress report, it is critical to promote the construction of a Healthy China, reform the medical and healthcare systems, and coordinate the development and regulation of medical insurance, medical services, and pharmaceuticals. With a main focus on disease prevention, this report emphasized the need to enhance the capacity for the prevention and treatment of major chronic diseases as well as health management. During this year's Two Sessions, the 2023 Report on the Work of the Government also clearly stated that vaccines should be upgraded and new drugs should be developed, while ensuring people’s access to medicines and medical services to protect their lives and health. To support the development and structural optimization of the vaccine industry, the Chinese government has developed industrial development plans and industrial policies. These measures will further promote technological innovation, standardize operations, and integrate the industry. Vaccine production and development will become more standardized, large-scale, intensive, innovative, and international.

Several national departments issued a number of industry policies, which provide a strong foundation for the implementation of the Healthy China Initiative and promotion of industry development. In January 2022, nine departments including the Ministry of Industry and Information Technology and National Development and Reform Commission jointly issued the 14th Five-Year Plan for the Development of China’s Pharmaceutical Industry, which highlighted the key development areas and directions of China’s pharmaceutical industry in the new era, promoted the transformation of the pharmaceutical industry to innovation-driven development, and aimed to enhance the stability and competitiveness of industrial chains and promote the overall acceleration of international development, thereby enabling the industry's development outcomes to meet the health needs of the people, and providing a solid guarantee for the all-around construction of a healthy China. In May 2022, the National Development and Reform Commission released the 14th

Five-Year Plan for the Development of China's Bioeconomy, which proposed to help with the early prevention of diseases, accelerate the upgrading of vaccine R&D and production technology, develop polyvalent and multipathogen vaccines, develop new genetically engineered and therapeutic vaccines, and improve the country's ability to deal with major severe infectious diseases. It further highlighted the need to improve the prevention and control mechanisms for major emerging infectious diseases, reform and improve disease prevention and control systems, and focus on strengthening grassroots disease prevention and control capacity building.

For the biopharmaceutical industry, one of the goals of realizing Chinese-style modernization is ensuring the accessibility and affordability of high-quality biopharmaceutical products. It is also essential to ensure that all people share the fruits of biopharmaceutical development to the greatest extent. As a strategic emerging industry that involves national welfare and people's livelihood, economic development, and national security, China's vaccine industry has broad prospects and promising future. China's biopharmaceutical industry is on the rise.

(II) Company profile

Zhifei is an international, full-industry chain high-tech bio-pharmaceutical enterprise integrating R&D, production, sales, distribution, import and export of vaccines and biological products. As an important global vaccine developer and supplier with mission and responsibility, for two decades, the Company always adheres to its business principle "prioritizing social benefits over corporate profits" and focuses on infectious disease prevention and control. With the development model featuring "technology&market" drivers, the coordinated development of diagnosis, prevention and treatment, and the innovative research and development, the Company continuously completes its "prevention and treatment of disease" business layout, to serve the public, and to contribute to a healthy China.

In the first half of 2023, there was no material change in the principal business of the Company. Beijing Zhifei Lvzhu Biopharmaceutical Co., Ltd. ("Zhifei Lvzhu") and Anhui Zhifei Longcom Biopharmaceutical Co., Ltd. ("Zhifei Longcom") renewed their efforts to introduce new products against bacteria, viruses and tuberculosis. The parent company of Zhifei, as the main promoter,

dedicated to diversifying vaccine products and providing more convenient and considerate services. Taking Zhifei Airport as the import and export channel, the Company also provides warehousing, customs clearance record, and batch release services for imported vaccines. In addition, the Company incubates and cultivates promising biotechnology and products through the Zhirui investment platform by equity investment.

(III) Major products and indication

As of the disclosure date of this report, a total of eleven products had been launched, of which one product got conditional approval. The Company offers a diverse range of products, including vaccine products for preventing infectious diseases such as influenza, COVID-19, cervical cancer, pneumonia, rotavirus and drugs for the diagnosis, prevention and treatment of Tuberculosis, to the public including groups of infants, teenagers and adults. It effectively provides product support for the prevention and control of infectious diseases, and provides the nation with diversified options for disease protection. Details are as follows:

No.	Common Name	Trade Name	Function and Use / Indication
1	Group $ACYW_{135}$ Meningococcal Polysaccharide Vaccine	Menwayc	Used to prevent the meningococcal meningitis caused by $ACYW_{135}$ meningococcal polysaccharide.
2	Meningococcal Group A and C Conjugate Vaccine	Mening A Con	Used to prevent infectious diseases caused by meningococcal Group A and C, such as cerebrospinal meningitis and pneumonia.
3	Haemophilus Influenzae Type b Conjugate Vaccine	Xifeibei	Used to prevent invasive infections caused by Haemophilus influenzae Type b (including meningitis, pneumonia, septicemia, cellulitis, arthritis, epiglottitis, etc.).
4	Group A and Group C Meningococcal Polysaccharide Vaccine	Mengnake	prevent epidemic cerebrospinal meningitis caused by Neisseria meningitidis group A and C
5	Recombinant Novel Coronavirus Vaccine (CHO Cell)	Zifivax™	Used to prevent diseases caused by Covid-19.
6	Recombinant Mycobacterium Tuberculosis Fusion Protein (EC)	Ekear	Used to diagnose mycobacterium tuberculosis infection, and the results of the subcutaneous test are not affected by the BCG vaccine and can be used for clinical diagnosis of tuberculosis.

7	Mycobacterium Vaccae for Injection	Vaccae	Used to prevent tuberculosis in the latent groups of infected people with mycobacterium tuberculosis; also used as a drug combination for the adjuvant tuberculosis chemotherapy.
8	Human Papillomavirus Quadrivalent (types 6, 11, 16, 18) Recombinant Vaccine	Gardasil	Used to prevent the following diseases caused by high-risk HPV16/18: cervical cancer, grade 2 and grade 3 cervical intraepithelial neoplasis (CIN2/3) and adenocarcinoma in situ, and grade 1 cervical intraepithelial neoplasis (CIN1).
9	Human Papillomavirus 9-valent Vaccine, Recombinant	Gardasil 9	Used to prevent the following diseases caused by HPV type contained in this product: cervical cancer caused by type HPV16, 18, 31, 33, 45, 52 and 58; precancerous lesions caused by HPV6, 11, 16, 18, 31, 33, 45, 52 and 58: cervical intraepithelial neoplasis (CIN2/3), cervical adenocarcinoma in situ (AIS), and cervical intraepithelial neoplasis (CIN1); persistent infections caused by type HPV6, 11, 16, 18, 31, 33, 45, 52 and 58.
10	Reassortant Rotavirus Vaccine, Live, Oral, Pentavalent (Vero Cell)	Rotateq	Used to prevent the rotavirus gastroenteritis in infants caused by serum-type G1, G2, G3, G4 and G9.
11	Pneumovax 23 - Pneumococcal Vaccine, Polyvalent	Pneumovax	Used to prevent the pneumococcal disease in the form of the capsulate bacteris contained in this vaccine.
12	Hepatitis A Vaccine (Human Diploid Cell), Inactivated	VAQTA	Used to prevent diseases caused by the hepatitis A virus.

(IV) Main business model

The Company has always conducted R&D, production and sales activities in strict compliance with the Law of the People's Republic of China on Vaccine Administration (hereinafter referred to as the "Vaccine Administration Law"), the Law of the People's Republic of China on Drug Administration (hereinafter referred to as the "Drug Administration Law") and Regulations on the Administration of Vaccine Production and Circulation and other applicable laws and regulations. The Company adheres to innovation-driven development through independent R&D, carries out cooperative R&D with leading R&D institutions, academies of sciences, etc., and engages in investment and incubation targeting cutting-edge technologies, hence the innovation strategy of "prioritizing independent R&D over cooperative R&D as well as investment and incubation." The breakthroughs in scientific research are successfully transformed into innovation outcomes so as to

satisfy people's health needs through technological innovation, product iteration, and launch of new products, and to revitalize the Company’s development.

The Company's production model is market-oriented. Applying this principle, the production department schedules production according to the sales plan of the marketing department. It develops production plan based on market needs while maintaining moderate inventory levels. The Company conducts production and inspection activities in accordance with approved production processes and quality control standards and also strictly complies with the Vaccine Administration Law, the Drug Administration Law and Regulations on the Administration of Vaccine Production and Circulation and other applicable laws to ensure that the entire production process meets the requirements of the Good Manufacturing Practice of Medical Products. The quality management department strictly supervises and controls product quality, and the Company's entire production quality management system guarantees that the entire product process continues to satisfy legal requirements.

The Company organizes academic promotion meetings and activities by its professional marketing team and adopts the direct sales model to enable its vaccines and anti-tuberculosis products to cover corporate end-users. The Company's vaccines are only available for sale after they are manufactured/imported and have obtained a national batch release and approval certificate. When the vaccines are procured by provinces, autonomous regions, and municipalities directly through the provincial public resource trading platforms, the Company will distribute vaccines to disease prevention and control institutions in accordance with the procurement contracts.

II. Analysis of Principal Business

(I) Key accounting data and financial indicators

During the reporting period, key financial indicators are shown below:

	2023 H1	2022 H1	Increase/decrease of the current period compared to the previous period
Operating income (RMB)	24,445,313,338.85	18,353,747,808.66	33.19%

Net profit attributable to shareholders of the Company (RMB)	4,259,927,399.09	3,729,017,351.47	14.24%
Net profit attributable to shareholders of the Company after deducting non-recurring gains and losses (RMB)	4,210,966,935.96	3,709,003,748.02	13.53%
Net cash flows from operating activities (RMB)	2,177,048,311.55	-1,380,303,201.53	257.72%
Basic earnings per share (RMB/share)	1.7750	1.5538	14.24%
Diluted earnings per share (RMB/share)	1.7750	1.5538	14.24%
Weighted average return on equity	16.32%	19.26%	-2.94%
	As at the end of 2023 H1	As at the end of 2022 H1	Increase/decrease of the current period compared to the previous period
Total assets (RMB)	38,003,733,941.95	30,047,323,465.36	26.48%
Net assets attributable to shareholders of the Company (RMB)	24,236,212,609.17	17,657,212,911.83	37.26%

(II) Changes in key financial data

	Reporting period	Same period of the previous year	Year-on-year increase/decrease	Reason for change
Operating income	24,445,313,338.85	18,353,747,808.66	33.19%	Mainly due to continued sales growth during the period
Operating cost	17,220,910,359.06	12,213,671,041.18	41.00%	Mainly due to the increase in sales revenue and change in sales structure during the period
Selling expenses	1,185,549,627.00	950,667,816.84	24.71%	
Administrative expenses	183,491,904.51	171,699,446.88	6.87%	
Financial expenses	21,991,273.87	6,921,587.24	217.72%	Mainly due to the increase in interest expense and letter of credit expense for the period
Income tax expenses	702,407,557.31	624,109,627.79	12.55%	
Research and development investment	583,147,276.33	518,129,488.03	12.55%	
Net cash flows	2,177,048,311.55	-1,380,303,201.53	257.72%	Mainly due to the increase in payment for

from operating activities				goods purchased during the period
Net cash flows from investment activities	-561,801,090.11	-813,506,033.66	30.94%	Mainly due to the decrease in payment for long-term assets during the period
Net cash flows from financing activities	-860,571,276.70	1,281,439,414.97	-167.16%	Mainly due to the increase in short-term loans returned and dividend payout during the period
Net increase in cash and cash equivalents	754,321,897.17	-903,413,938.75	183.50%	Mainly due to the increase in payments for goods in the period

(III) Products or services accounting for more than 10%

	Operating income	Operating cost	Gross profit margin	Increase/decrease in operating income as compared with the same period of the previous year	Increase/decrease in operating cost as compared with the same period of the previous year	Increase/decrease in gross profit margin as compared with the same period of the previous year
By product or service						
Proprietary product – vaccines and TB products	859,652,046.10	113,951,681.25	86.74%	-48.44%	-53.75%	1.78%
Agent product – vaccines	23,583,106,787.26	17,106,491,723.64	27.46%	41.35%	42.95%	-2.90%

(IV) Analysis of assets and liabilities

	As at the end of the reporting period		End of the previous year		Increase/decrease in proportion	Explanations on significant changes
	Amount	Proportion of total assets	Amount	Proportion of total assets		
Monetary funds	3,370,842,883.71	7.04%	2,622,063,766.18	6.90%	0.14%	
Accounts receivable	25,876,658,776.48	54.07%	20,613,901,100.57	54.24%	-0.17%	
Inventory	11,374,764,671.56	23.77%	8,020,470,692.08	21.10%	2.67%	Mainly due to the increase in agent product procurement during the period

Investment properties	9,755,151.00	0.02%	10,148,312.97	0.03%	-0.01%	
Fixed assets	3,078,672,729.53	6.43%	2,818,504,522.48	7.42%	-0.99%	
Construction in progress	1,734,522,263.07	3.62%	1,835,672,164.88	4.83%	-1.21%	
Right-of-use assets	33,109,011.07	0.07%	39,495,224.75	0.10%	-0.03%	
Short-term borrowings	2,800,000,000.00	5.85%	1,784,915,900.00	4.70%	1.15%	
Long-term borrowings	333,458,545.31	0.70%	210,642,031.86	0.55%	0.15%	
Lease liabilities	24,966,913.70	0.05%	27,764,877.22	0.07%	-0.02%	

III. MANAGEMENT DISCUSSION AND ANALYSIS

(I) Overview

2023 is the opening year after the 20th National Congress of the Communist Party of China. China's economy has shown strong resilience, starting on the path to stabilization and recovery. Meanwhile, growth momentum continues to build up, as the pace of high-quality development has been steady and powerful. Under the guidance of the new development stage, new development philosophy, and new development pattern, companies are giving full play to the principal role of scientific and technological innovation, advancing China's shift from a manufacturing-based to an innovation-based economy. The biopharmaceutical industry is currently in a stage of rapid development, with increasing investment in R&D, continuous enhancement of innovation, and acceleration of technological iteration to promote the penetration and integration of science and technology, economic and social development. In the booming industry landscape, biopharmaceutical companies are actively seizing opportunities and striving to break new ground. With the implementation of normalized pandemic prevention and control in China, people's health awareness and willingness to vaccinate have been significantly improved, and the market demand for vaccines also further increased.

During the reporting period, the Company posted RMB24,445,313,338.85 in operating income, representing a 33.19% year-on-year (YoY) increase. Net profit attributable to shareholders of the Company reached RMB4,259,927,399.09, a 14.24% YoY increase. Net profit attributable to shareholders of the Company after deducting non-recurring gains and losses amounted to RMB4,210,966,935.96, a 13.53% YoY increase. Adhering closely to the mission of "preventing and treating diseases to protect human health," the Company continues to optimize resource allocation, increase investment in R&D and innovation, improve market network construction, strengthen comprehensive competitive strengths, and deepen international development strategies, forging ahead to successfully complete this year's business goals.

During the reporting period, the main driving factors for the business performance of the Company include:

1. Focusing on R&D to expedite product innovation

The Company has always attached great importance to R&D and innovation. Steady funding and consistent investment in R&D personnel have enabled the Company to strengthen its leading R&D capabilities, enrich its range of proprietary products, and efficiently advance pipeline products under research, thereby consolidating its comprehensive strength. In the first half of 2023, the Company's R&D investment reached RMB 583 million, accounting for about 67.84% of revenue from independent products, representing a 12.55% YoY increase. The number of R&D employees grew to 818, a 26.43% YoY increase.

The Company continues to reinforce the sources of innovation momentum, focusing on cutting-edge technologies and conducting scientific research. During the Reporting Period, the Company completed the construction of an innovative product incubation center to strengthen foundational research, providing basic theoretical support and technologies for innovation and development, empowering the Company to realize the industrial transformation of more innovative achievements. The Company is committed to building teams of first class R&D professionals. In the first half of this year, it obtained approval to set up a post-doctoral scientific research station, yet another breakthrough achievement in professional cultivation and technological innovation. This

will help the Company attract more high-level professional talent, stimulate the vitality of independent innovation, and elevate the Company's technological innovation capabilities to a new level.

The Company efficiently advances in pipeline to accelerate product innovation. As of the report disclosure date, several ongoing research projects have made positive progress, laying a solid foundation for the seamless introduction of more proprietary products ahead: the drug production registration application for Quadrivalent Influenza Virus-split Vaccine was accepted; BCG-PPD began phase II clinical trial; the Recombinant Group B Meningococcal Vaccine began phase I clinical trial; and the Therapeutic BCG Vaccine and Omicron BA.4/5-Delta Recombinant Covid-19 Vaccine were approved for clinical trial.

As of the end of the reporting period, the Company held a sum of 30 independent development programs in pipeline, among which 17 were under clinical trials or application for registration. Further information is given as below:

Projects entering the registration Process

No.	Drug Name	Registration Class	Major Functions	Registration Stage	Progress
1	Pneumovax 23 - Pneumococcal Vaccine, Polyvalent	Prophylactic biologic products class 9	Used to prevent infectious diseases caused by streptococcus pneumoniae.	Registration	Drug registration review and approval
2	Quadrivalent Influenza Virus-split Vaccine	Prophylactic biologic products class 15	After vaccination, it can stimulate the body to produce anti-influenza virus immunity and is used to prevent	Registration	Drug registration review and approval
3	Lyophilized Rabies Vaccine for Human Use (MRC-5 Cell)	Prophylactic biologic products class 9	After vaccination, it can stimulate the body to produce anti-rabies virus immunity and is used to prevent rabies.	Clinical trial	Clinical trial completed
4	Influenza Virus-split Vaccine	Prophylactic biologic products	After vaccination, it can stimulate the body to produce anti-influenza virus	Clinical trial	Clinical trial completed
5	15-Valent Pneumococcal Conjugate Vaccine	Prophylactic biologic products	Used to prevent infectious diseases caused by streptococcus pneumoniae.	Clinical trial	Phase III clinical trial in progress
6	Lyophilized Rabies Vaccine for Human Use (Vero Cell)	Prophylactic biologic products class 15	After vaccination, it can stimulate the body to produce anti-rabies virus immunity and is used to prevent rabies.	Clinical trial	Phase III clinical trial in progress

No.	Drug Name	Registration Class	Major Functions	Registration Stage	Progress
7	S. flexneri and S. sonnei Bivalent Shigella Conjugate Vaccine	Prophylactic biologic products class 1	Used to prevent infectious diseases caused by Shigella.	Clinical trial	Phase III clinical trial in progress
8	ACYW$_{135}$ Meningococcal Conjugate Vaccine	Prophylactic biologic products class 7	Used to prevent infectious diseases caused by meningococcus.	Clinical trial	Phase III clinical trial in progress
9	DPT vaccine (component)	Prophylactic biologic products	Used to prevent diseases caused by pertussis, diphtheria and clostridium	Clinical trial	Phase III clinical trial in preparation
10	Intestinal Virus Type 71 Inactivated Vaccine	Prophylactic biologic products	Used to prevent diseases caused by EV71 infection.	Clinical trial	Phase II clinical trial in progress
11	Lyophilized Recombinant Tuberculosis Vaccine (AEC/BC02)	Prophylactic biologic products class 1	Used to prevent tuberculosis in the latent groups of infected people with mycobacterium tuberculosis	Clinical trial	Phase II clinical trial in progress
12	Quadrivalent Recombinant Norovirus Vaccine (Pichia Pastoris)	Prophylactic biologic products class 1	After vaccination, it stimulates the body to produce anti-norovirus immunity, which is used to prevent acute gastroenteritis caused by norovirus infection.	Clinical trial	Phase II clinical trial in progress
13	BCG-PPD	Therapeutic biologic products class 15	Used for clinical ancillary diagnosis of tuberculosis, epidemiological survey of tuberculosis and monitoring of body immune response after BCG vaccination. In combination with an in vivo diagnostic reagent (Recombinant Mycobacterium Tuberculosis Fusion Protein (EC)) for identification purposes, it can be used to identify the groups not infected with tuberculosis that are not vaccinated or are negative after vaccination by BCG, the groups not infected with tuberculosis that are positive after vaccination by BCG, and the groups infected with tuberculosis.	Clinical trial	Phase II clinical trial in progress
14	BCG	Prophylactic biologic products	After vaccination, it enables the body to generate cellular immune responses.	Clinical trial	Phase I clinical trial in progress
15	Inactivated Rotavirus Vaccine	Prophylactic biologic products	Used to prevent diarrhea caused by rotavirus.	Clinical trial	Phase I clinical trial in progress

No.	Drug Name	Registration Class	Major Functions	Registration Stage	Progress
16	Recombinant Group B Meningococcal Vaccine	Prophylactic biologic	Used to prevent infectious diseases caused by meningococcus.	Clinical trial	Phase I clinical trial in progress
17	Therapeutic BCG Vaccine	Prophylactic biologic	Used to treat bladder carcinoma in situ and prevent recurrence, and to prevent recurrence after transurethral resection of bladder papilloma in stage Ta or T1. This product is not intended for papilloma beyond T1 stage.	Clinical trial	Phase I clinical trial in preparation

Preclinical Project

No.	Product Name	Progress and Changes in	Expected Progress (2023-2024)	
1	Recombinant Hepatitis B Vaccine	Preclinical study	Preclinical study	Preclinical study
2	Bivalent HFMD Vaccine	Preclinical study	Preclinical study	Clinical Application
3	Bivalent Recombinant Rotavirus Vaccine	Preclinical study	Preclinical study	Clinical Application
4	Recombinant Zoster Vaccine (CHO cell)	Preclinical study	Clinical Application	Clinical Trial
5	Inactivated Japanese Encephalitis Vaccine	Preclinical study	Preclinical study	Clinical Application
6	Inactivated Varicella-zoster Virus Vaccine	Preclinical study	Preclinical study	Clinical Application
7	Respiratory Syncytial Virus (RSV)	Preclinical study	Preclinical study	Preclinical study
8	Recombinant MERS Virus Vaccine	Preclinical study	Preclinical study	Preclinical study
9	DPT-based Combination Vaccine	Preclinical study	Clinical Application	Clinical Trial
10	Pentavalent Meningococcal Conjugate	Preclinical study	Preclinical study	Clinical Application
11	Multivalent Pneumococcal Conjugate	Preclinical study	Preclinical study	Clinical Application
12	Quadrivalent Influenza Virus-split Vaccine (ZFA02 adjuvant)	Preclinical study	Preclinical study	Clinical Application
13	Mpox Vaccine	Preclinical study	Preclinical study	Preclinical study

Note: The above disclosed projects under development do not include Covid-19 vaccine series.

2. Improving marketing through considerate operations

The Company has a highly competitive marketing&sales team in the industry. After years of prudent team building efforts, it now has a large-scale direct sales network with extensive coverage, providing specialized and efficient “last mile” services to more than 30,000 primary health service points across the country. The Company deeply cultivates markets and end users, focuses on refined management of professional teams, conducts precise allocation of market resources, integrates

market information and insights in a timely fashion, flexibly responds to changes in the market environment, and takes full advantage of the strong performance of the market. In the first half of the year, the Company actively promoted and sold its proprietary products and agent products, creating positive social and corporate economic benefits, and feeding back the Company's research and production efforts with strong market sales, so as to continuously realize innovation and creation and promote the healthy development of the Company.

The Company has been actively participating in the prevention and control of tuberculosis (TB) in China, engaging in education and awareness work, deeply embodying the philosophy of "putting people and their lives first", and responding to the slogan of "Yes! We Can End TB!" on World TB Day 2023 to help bring an end to tuberculosis and safeguard people's health.The Company’s proprietary recombinant Mycobacterium tuberculosis fusion protein (EC) was included in National Drug Catalogue for Basic Medical Insurance, Work-Related Injury Insurance and Maternity Insurance (2022) for the first time, which is officially implement since this March. It will effectively promote the screening of Mycobacterium tuberculosis infection among key populations, enhancing public awareness of tuberculosis screening, prevention and treatment, and further facilitating the synergy of the Company's tuberculosis product matrix.

During the reporting period, the Company's vaccines were made available for sale only after they had obtained a national batch release and approval certificate in strict compliance with applicable laws and regulations of the People's Republic of China. The details of batch releases of Company's for-sale vaccines during the reporting period are presented as below:

1. Proprietary product

Manufacturer	Product Name	Number of Released and Approved Products in H1 2023 (Dose)	Number of Released and Approved Products in H1 2022 (Dose)	Growth Rate (%)
Zhifei Lvzhu	ACYW135 polysaccharide vaccine	3,396,143	1,761,547	92.79
	AC conjugate vaccine	0	2,903,009	-100
	Hib vaccine	570,701	0	100
	AC polysaccharide vaccine	449,165	608,503	-26.19

2. Agent product

Manufacturer	Product Name	Number of Released and Approved Products in H1 2023 (Dose)	Number of Released and Approved Products in H1 of 2022 (Dose)	Growth Rate (%)

MSD	Tetravalent HPV vaccine	6,266,651	4,876,778	28.50
	9-valent HPV vaccine	14,678,176	9,298,758	57.85
	Pentavalent rotavirus vaccine	6,596,753	4,864,045	35.62
	23-valent pneumonia vaccine	813,857	1,021,823	-20.35
	Inactivated hepatitis A vaccine	311,370	126,933	145.30

3. Quality first and compliance management

A complete corporate governance structure is an important guarantee for the steady development of listed companies. After more than two decades of development, the Company established a modern governance system and comprehensive compliance system to fully protect the legitimate rights and interests of shareholders, customers and employees, and promote the Company's long-term and sustainable development. The Company attaches great importance to compliance operations, and has formed a compliance management framework consisting of management and executive levels. The Company continues to revise compliance policies, strengthen training and publicity, and monitor project risks. Meanwhile, it remains responsive to the latest government and industry compliance policies, strengthens compliance monitoring, and constantly improves its risk prevention capabilities.

During the Reporting Period, the Company adhered to the business principle of “prioritizing social benefits over corporate profits” in its production and operating activities, and strictly complied with the Drug Administration Law, the Vaccine Administration Law, the Provisions for the Lot Release of Biological Products, and other applicable laws and regulations. In pursuit of providing high-quality products and professional services rooted in legal and compliant operations, the Company fully exploited its scientific research advantages as a vaccine R&D and production enterprise, and continued to build an industry-leading quality management system to ensure the development, production, storage, and supply of vaccines and other salable products. With its original aspiration and corporate credibility in mind, the Company strengthened quality management throughout the lifespan of products, in the quest for an honest and responsible corporate brand.

4. Exploit international opportunities in global cooperation

The Company is committed to pursuing its international development strategy, deeply implementing the overseas strategy for proprietary products, actively fostering and strengthening global partnerships, and bringing its high-quality products to the rest of the world to benefit more people. The Company is making great strides towards the vision of becoming a world-class biopharmaceutical enterprise.

During the Reporting Period, the Company was invited to participate in influential global pharmaceutical exhibitions such as the Convention of Pharmaceutical Ingredients (CPHI) to enhance the recognition of Zhifei's brand and products and expand potential cooperation opportunities. In July of this year, the Company signed a memorandum of cooperation with Indonesia-based PT Bio Farma on international market cooperation for the new mycobacterium tuberculosis vaccine product developed by Zhifei Longcom. The two sides will also carry out more in-depth collaboration and mutual assistance on tuberculosis prevention and control, and jointly promote the realization of WHO's Global Plan to End TB.

IV. Analysis of Core Competitiveness

(I) Delving into innovation-driven R&D

Technological innovation and breakthroughs are the mainstays of any burgeoning biopharmaceutical company, as well as the only path to its effective growth. In the process of product layout, the Company adheres to the innovation strategy of "putting independent R&D at the core, conducting cooperative R&D as a backup, engaging in investment and incubation as a supplement" and the program development principle of "project sourcing internationalization, target selection precision, project development pipelining, and production localization." The Company continues to strengthen independent development, expand technological cooperation, and foster innovation. As technological innovation brings about more profits, the Company's product R&D will take off on all fronts and evolve into greater core competitiveness.

1. Independent R&D progressing pipeline

The Company has three research and production centers, namely, Beijing Zhifei Lvzhu Biopharmaceutical Co., Ltd., Anhui Zhifei Longcom Biopharmaceutical Co., Ltd., and Chongqing ZhiRui Biopharmaceutical Industrial Park. Based on them, the Company continues to facilitate R&D, registration, and listing of quality independent products. Relying on Zhifei Lvzhu and Zhifei Longcom, the Company makes steady progress in product R&D, deeply cultivating in the field of disease prevention. Relying on ZhiRui Biopharmaceutical Industrial Park, the Company deepens the business layout in biological field, incubates and cultivates preventive and therapeutic biotechnology products.Through continuously strengthening its R&D capabilities and constantly broadened disease prevention and treatment layouts in biological verticals.

The Company has erected nine technology R&D platforms to include various development routes of vaccines. These emerging platforms grease the wheels of the coordinated construction of R&D matrices, ensuring that all R&D programs progress with effectiveness.

R&D Platforms		
Polysaccharide and polysaccharide conjugate vaccine technology platform	Genetic recombination technology platform	Inactivated vaccine technology platform
Multipathogen and multivalent vaccine technology platform	mRNA vaccine technology platform	Novel adjuvant technology platform
Human diploid cell line technology platform	Adenovirus vector vaccine technology platform	Outer membrane vesicle (OMV) technology platform

The Company holds 30 development programs in pipeline, of which 17 programs are in clinical trial stage or applications for registration. With manifest structures and an ample reserve, they form eight major product matrices featuring synergy, which furthers the Company's core competitiveness.

Matrices	**Programs under development**
Meningococcal vaccine matrix	Group $ACYW_{135}$ meningococcal conjugate vaccine, recombinant group B meningococcal vaccine (colon bacillus), and pentavalent meningococcal conjugate vaccine.
Pneumococcal vaccine matrix	15-valent pneumococcal conjugate vaccine, pneumovax 23 - pneumococcal vaccine, and multivalent pneumococcal conjugate vaccine.

Matrices	Programs under development
Enterovirus vaccine matrix	S. flexneri and S. sonnei Bivalent Shigella conjugate vaccine against dysentery, inactivated enterovirus type 71 vaccine, quadrivalent recombinant norovirus vaccine (pichia pastoris), bivalent HFMD vaccine, inactivated rotavirus vaccine, and bivalent recombinant rotavirus vaccine (pichia pastoris).
Tuberculosis product matrix	Lyophilized recombinant tuberculosis vaccine (AEC/BC02), BCG vaccine for intradermal injection, and purified protein derivative of BCG (BCG-PPD).
Multipathogen vaccine matrix	DPT vaccine (component) and DPT-based combination vaccine.
Emerging infectious disease vaccine matrix	Recombinant MERS virus vaccine, COVID-19 vaccines and Mpox vaccine.
Adult vaccine matrix	Influenza virus-split vaccine, quadrivalent influenza virus-split vaccine, lyophilized rabies vaccine for human use (MRC-5 cell), lyophilized rabies vaccine for human use (Vero cell), recombinant zoster vaccine (CHO cell), respiratory syncytial virus (RSV) vaccine, and Quadrivalent Influenza Virus-split Vaccine (ZFA02 adjuvant).
Upgraded vaccine	Inactivated Japanese encephalitis vaccine and inactivated varicella-zoster virus vaccine.
Note: The aforesaid matrices do not include all the programs under development, and details of R&D situation are shown in the relevant contents on R&D programs in this report.	

The Company values patent management and tries to accelerate the process of patent application and registration. Thus far the Company has acquired a total of 48 patents (including overseas) and continued to improve its system for protecting intellectual property rights.

2. Cooperative R&D for technological breakthroughs

Progress in biological technology rests on theoretical innovation and technological practices. The Company keeps abreast of the trends of infectious diseases and pushes for the integration of technology and industry. The Company creates a cooperative and communicative platform composed of businesses, universities, and research institutes, maintaining corporate development as the central task under the direction of market demands. It partners with a cohort of industrial institutions and scientific research platforms to address threats to human health.

The Company actively engages in academic communications on scientific research. Its research department has successively published 52 academic papers on *The Lancet*, the *New England Journal of Medicine*, and other medical journals since 2019, in a move to share its experience in cutting-edge R&D and clinical research. The Company collaborates with over 20 research institutes such as the Institute of Microbiology, Chinese Academy of Sciences (IMCAS)

and the National Clinical Research Center for Infectious Diseases to carry out joint clinical research and academic communications on innovative vaccines, TB prevention and treatment, and other programs.

3. Investment and incubation in greater health field

The Company incubates and cultivates promising biotechnology and products used for disease prevention and treatment through the ZhiRui Investment platform by equity investment to expand the coverage of its health business. Principally targeting the fields such as tumors, metabolic diseases, cardiovascular diseases, autoimmune diseases, and neurodegenerative diseases, ZhiRui Investment continues to build top-tier research teams to achieve R&D and industrialization of cutting-end biopharmaceuticals and biotechnology. After steady strides in recent years, ZhiRui Investment built various research and production platforms such as monoclonal antibodies, the cellular therapy, and diabetes-targeted biopharmaceuticals. Meanwhile, dozens of R&D programs are well under way, and several products step into clinical trials phase.

(II) Channel construction and market services

The Company forms a virtuous cycle through a development model featuring "technology & market" drivers, where marketing and R&D efforts are mutually enhancing. In the process of realizing the market value of products, the Company has always focused on clients' needs while keeping track of market demands and changes. The Company maintains an improved model of marketing and management to increase the overall efficiency of marketing efforts.

The Company highly emphasizes the construction of marketing networks, in a move to make the professional and considerate services of marketing staff accessible to more regions. As such, more people will benefit from the Company's quality vaccines. The Company extends its provincial-level marketing networks to 31 provincial-level regions, over 2,600 administrative districts and counties, and over 30,000 primary-level health centers through line management. By catering for the public and markets, the Company continues to invigorate its products and satisfy clients with well-pleasing services that help create value.

The Company is committed to building industry-leading marketing teams and continues to ameliorate the systems of marketing and services based on years of marketing experience under its belt. So far the Company has over 3,400 sales employees, and the services and professionalism of marketing personnel are continuously strengthened through training. The Company continues to improve the service system for clients, maintains convenient channels for communication, makes timely responses to clients' inquiries and requirements, and keeps close track of market demands. Meanwhile, through the support of professional medical service,the Company actively conduct various marketing work to disseminate the value of vaccines, realize the product value of preventing infectious diseases and serve the public to create social benefits.

（III）Quality first and product management

The Company adheres to the core values of "Quality First" and persistently pursues quality products and professional services by improving quality management throughout the lifespan of products. The Company has built a sound quality management system specifying quality-related highlights and responsibilities across different phases such as product R&D, material inspection, manufacturing, procurement, transport, storage, sales, and listing management. In all phases, the standardized and strict management procedures are put in place to ensure traceability of all recorded operations. This also guarantees its quality management system is sound, stable, and endurable.

The Company is capable of mass production, standardized quality control, and commercial development. The Company possesses industry-leading capacity of industrialization in China, and strives for improved productivity and quality control under international standards. Zhifei Lvzhu and Zhifei Longcom, two major research and production centers of the Company, are equipped with modern factories and devices used for vaccine production, as well as the specialized production staff with a strong sense of responsibility. Meanwhile, the Company seals lasting and stable relationships with reliable suppliers at home and aboard to guarantee the manufacturing and supply of products. Since the first batch of lot releases was approved in 2008, the independently developed products of the Company have all been successfully verified.

(IV) Professional management and talent enablement

The Company's core management is characterized by experienced talents with glittering careers and deep insights into disease prevention and control. In reference to the business performance, trends of industrial development, and market demands, the management staff remains stable, professional, and effective when presenting the development strategy suited to the status quo of the Company on a timely and purposeful basis.

The Company always adheres to the business principle of "prioritizing social benefits over corporate profits." Over the past two decades, the Company has cultivated unique corporate culture, in which "Six Firsts, Six Seconds" is considered as its corporate values. The Company's corporate culture plays a pivotal role in attracting, pooling, and retaining talents with shared values. The Company's sustainable development entails adequate staffing under the direction of multi-faceted incentive policies, the sound benefit sharing mechanism, and the stable talent cultivation strategy. As of the end of the reporting period, there were 5,730 employees, an increase of 653 (12.86%) over the first half of 2023. To acknowledge the contributions made by devoted employees, the Company makes an active attempt to offer employees with shares. Since the Company went public,it has carried out three employee stock ownership plans to share the fruits of corporate development with employees. This effectively enhances employees' motivation and ensures the future development of the Company.

V. Risks and Countermeasures

(I) Policy risk

As one of the strategic emerging industries in China,the pharmaceutical industry arouses extensive public attention and is highly regulated by government. Zhifei strictly implemented various systems in accordance with the Vaccine Administration Law and gradually improved its management, with the aim of enhancing its operation efficiency. However, with the rapid development of the economic society and increasingly stringent regulations, the subsequent policies may bring different changes in and have an impact on the production, sales and circulation of the Company. The Company pays close attention to the changes in policies and make timely adjustments to its business strategies to comply with the applicable regulations and regulatory

requirements. Zhifei adheres to compliance operations as always and our management team has profound professional knowledge and forward-looking thinking, both helping the Company to handle and respond to crises effectively when industry events occur and industrial policies are adjusted.

(II) Nonperforming debts

With the expansion of the Company's sales scale and business, the sales volume of both and agent product increases continuously, and thus contributes to a gradual increase in the Company's accounts receivable. As the implementation of industry policies has entered the normal stage, the Company implement industry policies timely, strengthens the risk control before vaccine sales, follows up the performance of contracts during the process and enhances the effectiveness of communication after the event to minimize risks of nonperforming debts.

(III) Talent management risk

As of the end of the reporting period, the Company has a total of 5730 employees. The constantly growing talent team is the solid foundation for the Company's business implementation in R&D, production and operation. However, the increasing scale of employment poses certain management risks. The Company strongly advocates the talent selection principle of "prioritizing integrity over capability", and integrated corporate culture into employee induction training and daily management to ensure teams's stability and code of conduct. At the same time, the company adopts a rich and diverse incentive mechanism to rejuvenate the vitality and motivation of the team.

(IV) Risks of public opinion response

With the facilitation of vaccination and the improvement of national awareness of disease prevention, the scope and quantity of vaccination products are steadily increasing, and there is a possibility of adverse reaction risks and thus triggers public opinion risks. Once a public opinion incident occurs, it will have a great impact on the vaccination work and the development of the vaccine industry. In addition to strengthening public awareness, establishing an effective after-sales communication system, and developing a responsible brand image, the company is accumulating and establishing a good reputation for its healthy development.

(V) Risk of hesitation to vaccination

Despite vaccination is the most economic and effective way to prevent infectious diseases, the unwillingness or refusal of vaccination ("hesitation to vaccination") may reverse the progress of vaccination against preventable diseases, and may cause a downturn in sales in the vaccine industry for a certain period of time, thereby affecting the Company's performance. For a long time, the Company has consistently and continuously adhered to standardized operation, continued to invest in the academic promotion of vaccine value, actively participated in the popularization of vaccine knowledge and the cultivation of vaccination notification and demand, and promoted the public's rational awareness of vaccination.